

American Electric Power
Conesville Plant
47201 CR 273
Conesville, OH 43811 9799
740.329.2373



United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard, LR-8J
Chicago, IL 60604
Attention: Mr. Derrick Samaranski

via Certified Mail
Return Receipt Requested

March 17, 2011

Re: RCRA Request for Information
Conesville Generating Station
47201 CR 273
Conesville, OH 43811
U.S. EPA ID No: OHD000816686

Dear Mr. Samaranski:

As required by Section 3007 of the Resource Conservation and Recovery Act (RCRA), 42 U. S. C. § 6927, we are providing you with information and responses to the requests posed in the certified letter we received on February 7, 2011. Many of the responses are accompanied with supporting documentation in Attachments 2, 3, and 5.

Question 1: Identify each and every person consulted in preparing the answers to this Request for Information. Provide the full name and title for each person identified.

Answer:

- Georgianne Hammond – Conesville Generating Station – Plant Environmental Coordinator Senior
- Kevin Mack – American Electric Power - Legal Environment Health and Safety, Senior Counsel
- Lorri Zella – American Electric Power - Land Environment and Remediation Services – Engineer III
- Michael Beck – American Electric Power - GET Engineering FGD Systems and Chemical Engineering, Engineer III
- Timothy Lohner - American Electric Power - Water and Ecological Resource Services, Principal Environmental Specialist
- Doug Green – Venable L.L.P. – Attorney

Question 2: Provide the following information for each water-side cleaning event of the combustion boilers conducted at the Conesville Generating Station plant in the past five years ending at 08/11/2010:

- a) The date(s) the cleaning occurred,
- b) Identify the combustion boiler unit(s) cleaned,
- c) Describe the cleaning procedure including volumes of liquids, names of chemicals, and length of cleaning,
- d) Copies of the MSDS sheets of the chemical agents used during the cleaning.

Answer: a), b) The following is a list of boiler chemical cleaning dates and the respective units cleaned for the past five years ending on August 11, 2010:

1. Unit 3 – May 2006
2. Unit 4 – March 2006
3. Unit 4 – May 2009
4. Unit 5 – April 2008
5. Unit 6 – May 2008

Combustion boiler units 1 and 2 are retired and there was no cleaning of these units.

- c) A description of the boiler chemical cleaning procedure, which includes volumes of liquids, names of chemicals, and length of cleaning is included with this response in "Attachment for Question 2".
- d) Copies of the MSDS sheets for the chemicals used throughout the cleaning process are also included in "Attachment for Question 2".

Question 3: Provide the following information for each waste stream(s) generated during each boiler cleaning event described in 2 above:

- a) Chemical composition of the waste stream,
- b) Copies of TCLP results of the waste stream prior to any on-site or off-site treatment,
- c) Amount of each waste generated in gallons or pounds,
- d) Describe on-site units (ex. Containers, tanks) used to accumulate the waste including type of construction materials and volume,
- e) Copies of any hazardous waste tank installation or certification documents,
- f) How long was the waste accumulated on-site,
- g) Copies of weekly or daily inspection logs of accumulation units
- h) Copy of construction and design drawings for the units

Answer: a) Each boiler chemical cleaning generates a waste stream comprised of cleaning solvents/solution and rinsate water. Rinsate water accounts for approximately 90%-98% of the waste stream volume. The remaining 2%-10% of the waste stream consists of the following cleaning liquids: ammoniated EDTA (which has several brand names), Cronox 240, A300, Eliminox, Aqua Ammonia, and SAG 10 anti-foam. The constituents resulting from these waste streams are: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver.

- b) Copies of the TCLP results from the boiler chemical cleaning wastes (BCCW) are included in "Attachment for Question 3".
- c) Each boiler chemical cleaning generated approximately 140,000 – 1,004,780 gallons of waste. This equates to approximately 1,168,342 – 8,385,191 pounds of waste.
- d) The Conesville Generating Station utilizes either a permanent onsite metal cleaning waste tank or temporary frac tanks to accumulate the waste stream. The permanent onsite tank has a capacity of 750,000 gallons and was constructed from carbon steel. The temporary frac tank has a capacity of 19,404 gallons. 3-4 tanks may be used during one cleaning to store the total waste volume. The temporary frac tanks were constructed from ¼" thick ASTM A36 carbon steel with a chemical resistant lining.
- e) The Conesville Generating Station does not have any copies of hazardous waste tank installations or certification documents to submit to the U.S. EPA since no such tanks are present at this facility.
- f) During a boiler chemical cleaning, the cleaning solvents/solution and rinsate water was stored on site no longer than 4 weeks.
- g) Copies of the operation and inspection logs are included in "Attachment for Question 3".
- h) Copies of the design specifications and construction information are included in "Attachment for Question 3".

Question 4: Provide the following information for each waste stream(s) generated during each boiler cleaning event described in 2 above:

- a) Describe type of treatment(s) conducted on the waste,
- b) Describe waste treatment units (include a copy of the construction and design drawings for the units),
- c) Duration of the waste treatment,
- d) Copies of the TCLP results of the waste after treatment,
- e) Describe the final disposal of the waste,
- f) Copies of the logs of burning of the waste,
- g) Copies of the LDRs for the disposed waste,
- h) Copies of the manifests for off-site disposal.

Answer: a) The wastes normally generated from the boiler chemical cleanings at the Conesville Generating Station are not hazardous as defined by 40 CFR §261 and therefore treatment is not required. In the past five years, Conesville Generating Station has had one boiler chemical cleaning, Unit 4 - May 2009, that was determined to exceed a toxicity characteristic as identified in 40 CFR §261.24. Upon realization that the waste contained elevated concentrations of total chromium, the BCCW was diluted and retested to demonstrate it was non-hazardous. Once analytical confirmation was received, the BCCW was thermally evaporated in Unit 5. Copies of information supporting these statements can be found in "Attachment for Question 3".

- b) The Conesville Generating Station utilizes either a permanent onsite metal cleaning waste tank or temporary frac tanks to accumulate the waste stream. The permanent onsite tank has a capacity of 750,000 gallons and is composed of carbon steel. The temporary frac tank has a capacity of 19,404 gallons. 3-4 tanks may be used during one cleaning to store the total waste volume. The temporary frac tanks are composed of 1/4" thick ASTM A36 carbon steel with a chemical resistant lining. Copies of information supporting these statements can be found in "Attachment for Question 3".
- c) As stated in the response to part a) of Request No. 3, BCCW does not normally require treatment. Should treatment be required, Conesville Generating Station would render the BCCW non-hazardous through dilution, which is permissible as long as the dilution occurs in a 90-day accumulation tank or container pursuant to 40 CFR §261.34 or in a "totally enclosed treatment facility" as defined under 40 CFR §260.10. (As explained in the response to Request No. 5, the land disposal restriction (LDR) dilution prohibition is not implicated by the facility's management of the BCCW.)
- d) Copies of the analytical results from each boiler chemical cleaning for the time period specified are included in "Attachment for Question 3".
- e) BCCW was injected into the boilers and evaporated at a controlled rate so that the percentage of BCCW was less than 50% of the total input to the boiler.
- f) Copies of the logs documenting the evaporation of the waste are included in "Attachment for Question 3".
- g) The Conesville Generating Station has no copies of LDRs for the waste disposed since no hazardous wastes were generated.
- h) The Conesville Generating Station has no copies of manifests for the waste disposed since none were required.

Question 5: Do you contend that the waste streams generated from the combustion cleaning unit clean-out or your storage and treatment on-site is exempt from regulation under RCRA or does not require a RCRA permit? Provide a detailed explanation for your response. Include documentation related to your response.

Answer: None of the waste streams generated from the boiler chemical cleanings identified in this response were subject RCRA's permit requirements. As described in the data response to Request No. 3, only one boiler chemical cleaning waste stream generated during the five-year evaluation period exhibited the toxicity characteristic ("TC") for chromium (*i.e.*, the boiler cleaning that occurred on May 16, 2009). All other boiler chemical cleaning waste streams generated during the five-year evaluation period did not exhibit a hazardous waste characteristic and therefore their management did not implicate RCRA's Subtitle C hazardous regulations.¹

¹ In assessing the composition of the boiler chemical cleaning waste streams for purposes of waste characterization, the Conesville Generating Station adhered to EPA's directive clarifying that, "specific to power plant boiler cleanout . . . generation is at the completion of the entire cleanout process." See 62 Fed. Reg. 25998, 26006 (May 12, 1997); see also 63 Fed. Reg. 28556, 28623-24 (May 26, 1998). Specifically, EPA "views the cleanout of the boilers as one process and therefore does not consider the mixing of acid rinse and water rinse as impermissible dilution but as a single waste

With respect to the single waste stream that exceeded the TC for chromium in May 2009, the Conesville Generating Station collected the wastes in an on-site tank dedicated to the accumulation of boiler chemical cleaning waste. The tank is directly connected to the boiler and the boiler chemical cleaning waste from the boiler is hard piped directly from the boiler to the dedicated accumulation tank. This accumulation system is designed and operated to prevent the release of hazardous waste or constituents into the environment and qualifies as a totally enclosed treatment facility ("TETF"), exempt from RCRA's permit requirements. See 40 C.F.R. § 270.1(c)(2)(iv) (setting forth the exclusion from RCRA's permitting requirements for TETFs). In fact, the Ohio Environmental Protection Agency ("OEPA") recently confirmed that a series of inter-connected frac tanks used to accumulate boiler chemical cleaning wastes from a boiler chemical cleaning qualified as TETF. See OEPA letter to Ohio Valley Electric Company, Dec. 16, 2008 (Attachment for Question 5). As the accumulation system at the Conesville Generating Station is a fixed, steel tank directly connected to the boiler system, it also qualifies as a TETF.

The dedicated boiler cleaning waste tank at the Conesville Generating Station also is exempt from RCRA regulation because it qualifies as wastewater treatment unit ("WWTU"). See 40 C.F.R. § 270.1(c)(2)(v) (setting forth the exclusion from RCRA's permitting requirements for WWTUs). WWTU is defined, in pertinent part, to include a device which is part of a wastewater treatment facility subject to regulation under sections 402 or 307(b) of the Clean Water Act ("CWA"), receives and treats or stores an influent wastewater that is hazardous, and meets the definition of tank. See 40 C.F.R. § 260.10. The Conesville Generating Station has an NPDES permit issued under section 402 of the CWA (NPDES permit No. 01B00013*LD). That permit specifically references and imposes management and related conditions on the facility's dedicated boiler chemical waste accumulation tank. See page 23 of permit directing that boiler chemical cleaning wastes are to be pumped to the dedicated accumulation tank and requiring, among other things, that spill control measures be employed for that tank (Attachment for Question 5). In the case of the May 2009 cleaning, the dedicated boiler cleaning waste accumulation tank qualified as a WWTU because it (1) is a device that is part of the Station's wastewater treatment facility, (2) received and stored an influent wastewater that was hazardous, and (3) meets the definition of tank in 40 C.F.R. § 260.10 (a "stationary device, designed to contain an accumulation of hazardous waste which is constructed primarily of non-earthen materials (e.g., wood, concrete, steel, plastic) which provide structural support"). Therefore the dedicated boiler chemical cleaning tank also is exempt from RCRA regulation because it is a WWTU.

Upon determining that the boiler chemical waste from the May 2009 cleaning exceeded the TCLP levels for chromium, the facility transferred the wastes from the dedicated accumulation tank to a series of frac tanks temporarily brought on site, where the wastes were diluted to render the materials non-hazardous. These frac tanks operated as 90-day accumulation containers pursuant to 40 C.F.R. § 262.34 and therefore were exempt from

rinsate resulting from the single cleanout process." *Id.* Further, consistent with the Agency's statement that this "point of generation" concept for boiler cleaning wastes applies where the entire boiler cleaning waste stream is managed in a single containment system (*id.*), the Conesville Generating Station accumulated the wastes in its on-site tank dedicated to the accumulation of the boiler chemical cleaning waste.

RCRA's permit requirement. *See* 51 Fed. Reg. 10146, 10168 (March 24, 1986) (confirming that 90-day accumulation containers may be used to treat wastes without a RCRA permit). The non-hazardous waste was then disposed of through evaporation in an on-site coal-fired boiler and the resulting combustion residuals were disposed of as Bevill amendment fossil fuel combustion waste exempt from Subtitle C regulation, including RCRA's LDRs. This management practice is expressly contemplated in EPA's "Dietrich letter" (Jan. 13, 1981), which sets forth the Agency's interpretation of the fossil fuel combustion waste clause of the Bevill Amendment.

EPA makes clear in the Dietrich letter that the combustion residuals from co-burning secondary materials in a coal fired boiler are covered by the Bevill Amendment exclusion from Subtitle C regulation provided that the secondary materials make up less than 50% of the input to the boiler. *See* Dietrich Letter at 4. EPA has subsequently clarified that it is not necessary for the secondary materials co-fired with coal in a utility boiler – including, for example, boiler chemical cleaning waste – to have any heat value to qualify for this management option. *See* 58 Fed. Reg. 42466, 42469, n. 4 (Aug. 9, 1993). Because the combustion residuals from this co-burning process are covered by the Bevill Amendment, the residuals are not subject to RCRA's LDR treatment standards, including the LDR dilution prohibition. *See Horsehead Resource Development Co. v. EPA*, 16 F.3d 1246, 1261 (D.C. Cir. 1994) (Bevill residues, including secondary materials co-burned with coal, are not subject to the LDRs, including the LDR dilution prohibition). *See also* EPA Memorandum entitled "Regulation of Fuel Blending and Related Treatment and Storage Activities," from Director of EPA's Office of Solid Waste to Hazardous Waste Management Division Directors (Oct. 17, 1994) (explaining that combustion residuals from Bevill combustion devices are not subject to LDR treatment standards).

For these reasons, EPA has expressly found that the management process for boiler cleaning wastes such as that employed by the Conesville Generating Station – *i.e.*, dilution to remove a hazardous characteristic in a RCRA exempt unit and the subsequent evaporation of the non-hazardous waste in a coal-fired boiler – is exempt from RCRA's permitting requirement and the RCRA LDR treatment standards. Specifically, in response to a letter from the Oklahoma Department of Environmental Quality ("ODEQ") requesting confirmation of the RCRA exempt status of boiler chemical cleaning wastes managed in the above manner, EPA concurred that the "referenced process is permissible" and that the resulting combustion residuals qualified for the fossil fuel combustion waste clause of the Bevill Amendment under 40 C.F.R. § 261.4(b)(4). *See* ODEQ letter to EPA, dated Feb. 13, 1995, and EPA response letter to ODEQ, dated May 12, 1995 (Attachment for Question 5). OEPA has specifically concurred with the above management practice for boiler chemical cleaning wastes. *See* OEPA Letter to Ohio Valley Electric Company, Dec. 16, 2008 (Attachment 5) (confirming that the combustion residuals from evaporating de-characterized boiler chemical cleaning wastes in a coal-fired boiler are excluded by the Bevill Amendment from hazardous waste regulation, including the LDRs and the LDR dilution prohibition).

In summary, only one boiler chemical cleaning waste identified in this response exceeded the TC for chromium. That particular waste stream was managed in a manner that did not trigger RCRA's Subtitle C hazardous waste permitting requirements.

If you have any questions regarding this submittal, please contact Georgeanne Hammond at (740) 829-4065.

"I certify under the penalty of law that I have examined and am familiar with the information submitted in responding to this information request for production of documents. Based on my review of all relevant documents and inquiring of those individuals immediately responsible for providing all the relevant information and documents, I believe that the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."



Brian Scragg, Registered Agent
Conesville Generating Station

Sincerely,



Brian Scragg
Plant Manager
Conesville Generating Station

Attachments

ATTACHMENT FOR QUESTION 2

Conesville Unit 3
Chemical Clean Information

Chemical Clean Dates: 5/14/2006 -- 5/18/2006

Description of Procedure:

The unit uses ammoniated EDTA to remove iron/copper corrosion product deposits from steel boiler tube surfaces in a two stage process. A corrosion inhibitor is also added to the cleaning solution to protect base metal from the cleaning solvent. In the first stage of the clean, EDTA with the inhibitor are used to dissolve iron deposits. In the second stage, oxygen is added to oxidize the cleaning solution enabling it to dissolve copper deposits. The cleaning solvent is then drained from the boiler to temporary storage tanks that are brought onsite for the clean. The boiler is rinsed twice with condensate quality water to remove any remaining amounts of cleaning solvent. All rinses are captured in the temporary storage tanks. After TCLP analysis confirms the waste is non-hazardous, the waste is thermally evaporated.

Cleaning Liquids	Volume Used (gals)	
Treated Plant Intake Water (Condensate)	129520	(51500 used in initial cleaning solvent and balance used during boiler rinses)
Tetra-Ammonium EDTA (Cleaning Solvent)	10440	
Cronox 240 (Corrosion Inhibitor)	40	

Length of Cleaning

74 hours (Injection of chemical cleaning solvent and completion of rinses)

Conesville Unit 4

Chemical Clean Information

Chemical Clean Dates: 3/25/2006 -- 3/27/2006
5/16/2009 -- 5/17/2009

Description of Procedure:

The unit uses ammoniated EDTA to remove iron corrosion product deposits from steel boiler tube surfaces in a two stage process. In the first stage, EDTA is used to dissolve iron deposits and then discharged to a metal cleaning waste tank. A corrosion inhibitor is also used to protect base metal from the cleaning solvent. In the second stage the cleaning solvent is drained to an onsite metal cleaning waste tank. Then, in order to passivate steel tube surfaces, the steam generator is refilled with demineralized water, aqua-ammonia is added to raise the pH to 9.0 and finally an oxygen scavenger is added to act as a reducing agent. After completion of the second stage the passivation solution is drained to the metal cleaning waste tank and the cleaning circuit is rinsed with condensate quality water. Typically the unit is rinsed until the metal cleaning waste tank is full/nearly full through the exact amount varies each clean. All rinse waste is captured in the metal cleaning waste tank. (For 2009 clean 4 frac tanks were also used to facilitate dilution of waste)

	Volume Used (gals)	Volume Used (gals)	
	2006 Clean	2009 Clean	
Cleaning Liquids			
- Treated Plant Intake Water (Condensate)	529800	994000	
ChelClean 665 Tetra-ammonium EDTA (Cleaning Solvent)	4840	--	
Versene Di-ammonium EDTA (Cleaning Solvent)	--	9500	
A300 (Corrosion Inhibitor)	117	--	Note: Difference in inhibitor volumes is since the 2006 clean we increased the inhibitor % used in cleaning solvents.
Cronox 240 (Corrosion Inhibitor)	--	1180	
Eliminox (Oxygen Scavenger)	100	100	
Aqua Ammonia (pH Control)	--	--	Exact amount unknown - The amount used is not recorded during the clean.
Length of Cleaning			
2006 Clean	2009 Clean		
37 hours	27		(From chemical cleaning solvent injection to completion of flushes)

Conesville Unit 5
Chemical Clean Information

Chemical Clean Dates: 4/10/2008 -- 4/11/2008

Description of Procedure:

The unit uses ammoniated EDTA to remove iron/copper corrosion product deposits from steel boiler tube surfaces in a two stage process. A corrosion inhibitor is also added to the cleaning solution to protect base metal from the cleaning solvent. In the first stage of the clean, EDTA with the inhibitor are used to dissolve iron deposits. In the second stage, an anti-foam agent is added and ammonia is injected to obtain a pH of 9.5. Oxygen is then injected to oxidize the cleaning solution to enable it to dissolve copper deposits. The cleaning solvent is then drained to an onsite metal cleaning waste tank. The boiler is then rinsed twice with condensate quality water to remove any remaining amounts of cleaning solvent. All rinses are captured in the metal cleaning waste tank. After TCLP analysis confirms the waste is non-hazardous, the waste is thermally evaporated.

Cleaning Liquids	Volume Used (gals)	
Treated Plant Intake Water (Condensate)	141000	
Versene Di-ammonium EDTA (Cleaning Solvent)	4000	
Cronox 240 (Corrosion Inhibitor)	52	
SAG 10 Anti-Foam	5	
Aqua Ammonia (pH Control)	--	Unknown - The amount used is not recorded during the clean

Length of Cleaning

29 hours (Injection of chemical cleaning solvent and completion of rinses)

Conesville Unit 6
Chemical Clean Information

Chemical Clean Dates: 5/26/2008 -- 5/27/2008

Description of Procedure:

The unit uses ammoniated EDTA to remove iron/copper corrosion product deposits from steel boiler tube surfaces in a two stage process. A corrosion inhibitor is also added to the cleaning solution to protect base metal from the cleaning solvent. In the first stage of the clean, EDTA with the inhibitor are used to dissolve iron deposits. In the second stage, an anti-foam agent is added and ammonia is injected to obtain a pH of 9.5. Oxygen is then injected to oxidize the cleaning solution to enable it to dissolve copper deposits. The cleaning solvent is then drained to an onsite metal cleaning waste tank. The boiler is then rinsed twice with condensate quality water to remove any remaining amounts of cleaning solvent. All rinses are captured in the metal cleaning waste tank. After TCLP analysis confirms the waste is non-hazardous, the waste is thermally evaporated.

Cleaning Liquids	Volume Used (gals)	
Treated Plant Intake Water (Condensate)	145000	
Versene Di-ammonium-EDTA (Cleaning Solvent)	4414	
Cronox 240 (Corrosion Inhibitor)	52	
SAG 10 Anti-Foam	5	
Aqua Ammonia (pH Control)	--	Unknown - The amount used is not recorded during the clean

Length of Cleaning

25 hours (Injection of chemical cleaning solvent and completion of rinses)

Printed Date:01/09/01

MSDS Number: CSW9100983 Rev:001 MSDS Status: ASSIGNED CSW MSDS: 99100983

Mfr MSDS No: 036027 Mfr Date : 08/12/97 MSDS Section(s)

Product:ELIMIN-OX OXYGEN SCAVENGER 01 to 16

Section 01 MANUFACTURER IDENTIFICATION

Product Name: ELIMIN-OX OXYGEN SCAVENGER

Catalog ID : Part Number :

Chem Family :

Synonyms : ELIMIN-OX OXYGEN SCAVENGER

Manufacturer: NALCO

Mfr Address : ONE NALCO CENTER

NAPERVILLE IL 60563-1198 US

Mfr Contacts: MEDICAL 24 HOURS

Telephone No: EMERGENCY MAIN PHONE
(800) 462-5378 630-305-1000 (800) I-M ALERT

- Section 02 COMPOSITION & INGREDIENTS INFO

OTHER TEXT SEE BELOW CAS No.: Pct:

ADDITIONAL INFORMATION ON COMPONENTS (E.G. EXPOSURE GUIDELINES)

OTHER TEXT

OUR HAZARD EVALUATION OF THE INGREDIENT(S) UNDER
OSHA'S HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 HAS
FOUND NONE OF THE INGREDIENT(S) HAZARDOUS.
OUR HAZARD EVALUATION OF THE INGREDIENT(S) UNDER
OSHA'S HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 HAS
FOUND NONE OF THE INGREDIENT(S) HAZARDOUS.

- Section 03 HAZARDS IDENTIFICATION

HAZARDS IDENTIFICATION Procedure

ACUTE EYE CONTACT :NON-IRRITATING.

ACUTE SKIN CONTACT :CAN CAUSE MILD, SHORT-LASTING IRRITATION.

EMERGENCY OVERVIEW :SEE BELOW

MEDICAL AGGRAVATION :SEE BELOW

ROUTES OF ENTRY :EYE, SKIN

SYMPTOMS OF EXPOSURE :SEE BELOW

EMERGENCY OVERVIEW

EMERGENCY OVERVIEW

CAUTION:

MAY CAUSE SKIN IRRITATION. AVOID CONTACT WITH SKIN AND
CLOTHING. AVOID PROLONGED OR REPEATED BREATHING OF
VAPOR. USE WITH ADEQUATE VENTILATION. DO NOT TAKE
INTERNALLY.

Printed Date:01/09/01

MSDS Number: CSW9100983 Rev:001 MSDS Status: ASSIGNED CSW MSDS: 99100983

Mfr MSDS No: 036027 Mfr Date : 08/12/97 MSDS Section(s)

Product:ELIMIN-OX OXYGEN SCAVENGER 01 to 16

EMERGENCY OVERVIEW

EMPTY CONTAINERS MAY CONTAIN RESIDUAL PRODUCT. DO NOT
REUSE CONTAINER UNLESS PROPERLY RECONDITIONED.

SYMPTOMS OF EXPOSURE

A REVIEW OF AVAILABLE DATA DOES NOT IDENTIFY ANY
SYMPTOMS FROM EXPOSURE.

MEDICAL AGGRAVATION

A REVIEW OF AVAILABLE DATA DOES NOT IDENTIFY ANY
WORSENING OF EXISTING CONDITIONS.

- Section 04 FIRST AID MEASURES

FIRST AID MEASURES AND INSTRUCTIONS Procedure

EYE CONTACT :FLUSH WITH WATER FOR 15 MINUTES.

INGESTION :SEE BELOW

INHALATION :SEE BELOW

NOTES TO PHYSICIAN :SEE BELOW

SKIN CONTACT :FLUSH WITH WATER FOR 15 MINUTES.

INSTRUCTIONS TO MEDICAL PERSONNEL OR ADDITIONAL INFORMATION

INGESTION

INDUCE VOMITING. GIVE WATER. CALL A PHYSICIAN.

INHALATION

REMOVE TO FRESH AIR. TREAT SYMPTOMS. CALL A PHYSICIAN.

NOTES TO PHYSICIAN

BASED ON THE INDIVIDUAL REACTIONS OF THE PATIENT, THE PHYSICIAN'S JUDGMENT SHOULD BE USED TO CONTROL SYMPTOMS AND CLINICAL CONDITION.

CAUTION: IF UNCONSCIOUS, HAVING TROUBLE BREATHING OR IN CONVULSIONS, DO NOT INDUCE VOMITING OR GIVE WATER.

Section 05 FIRE FIGHTING MEASURES

FIRE & EXPLOSION HAZARD DATA VALUE UNIT Procedure

EXPLOSION HAZARD :SEE BELOW

EXTINGUISHING MEDIA :NOT APPLICABLE

FLASH POINT :NONE (PMCC) ASTM'D-93

NFPA FLAMMABILITY :0

NFPA HEALTH :1

NFPA REACTIVITY :0

OTHER TEXT :SEE BELOW

PROCEDURES AND GUIDANCE IN AVOIDING AND FIGHTING FIRES

EXPLOSION HAZARD

MAY EVOLVE NOX UNDER FIRE CONDITIONS. CONTAINERS EXPOSED IN A FIRE SHOULD BE COOLED WITH WATER TO PREVENT VAPOR PRESSURE BUILDUP LEADING TO A RUPTURE.

Material Safety Data Sheet Page: 3

Printed Date:01/09/01

MSDS Number: CSW9100983 Rev:001 MSDS Status: ASSIGNED CSW MSDS: 99100983

Mfr MSDS No: 036027 Mfr Date : 08/12/97 MSDS Section(s)

Product:ELIMIN-OX OXYGEN SCAVENGER 01 to 16

PROCEDURES AND GUIDANCE IN AVOIDING AND FIGHTING FIRES

OTHER TEXT

0=INSIGNIFICANT 1=SLIGHT 2=MODERATE 3=HIGH 4=EXTREME

- Section 06 ACCIDENTAL RELEASE MEASURES

ACCIDENTAL RELEASE MEASURES DATA Procedure

LARGE SPILL :SEE BELOW

SMALL SPILL :SEE BELOW

ACTIONS TO MINIMIZE ADVERSE EFFECTS OF ACCIDENTAL SPILLS/RELEASES

SMALL SPILL

CONTAIN WITH ABSORBENT MATERIAL, SUCH AS CLAY, SOIL OR ANY COMMERCIALY AVAILABLE ABSORBENT. SHOVEL RECLAIMED LIQUID AND ABSORBENT INTO RECOVERY OR SALVAGE DRUMS FOR DISPOSAL. REFER TO CERCLA IN SECTION 15.

LARGE SPILL

DIKE TO PREVENT FURTHER MOVEMENT AND RECLAIM INTO RECOVERY OR SALVAGE DRUMS OR TANK TRUCK FOR DISPOSAL.

REFER TO CERCLA IN SECTION 15.
FOR LARGE INDOOR SPILLS, EVACUATE EMPLOYEES AND
VENTILATE AREA. THOSE RESPONSIBLE FOR CONTROL AND
RECOVERY SHOULD WEAR THE PROTECTIVE EQUIPMENT
SPECIFIED IN SECTION 8.

- Section 07 HANDLING AND STORAGE

SPECIAL PRECAUTIONS Procedure
STORAGE :SEE BELOW
APPROPRIATE PRACTICES FOR SAFE HANDLING AND STORAGE
STORAGE
KEEP CONTAINER CLOSED WHEN NOT IN USE.

STORE AT TEMPERATURES BELOW 120 DEGREES F AND ABOVE 40
DEGREES F. AT TEMPERATURES BELOW 40 DEGREES F, THIS
PRODUCT LOSES ITS STABILITY AND FORM PRECIPITATES.
ONCE FORMED, THE PRECIPITATE CANNOT BE RESOLUBILIZED
AND LOSS OF PRODUCT ACTIVITY WILL OCCUR.

- Section 08 EXPOSURE CNTL/PERSONAL PROTCTN

EXPOSURE CONTROLS/PERSONAL PROTECTION Procedure
OTHER PROTECTION :SEE BELOW
PROTECTIVE EQUIPMENT :SEE BELOW

Material Safety Data Sheet Page: 4
Printed Date:01/09/01

MSDS Number: CSW9100983 Rev:001 MSDS Status: ASSIGNED CSW MSDS: 99100983
Mfr MSDS No: 036027 Mfr Date : 08/12/97 MSDS Section(s)
Product:ELIMIN-OX OXYGEN SCAVENGER 01 to 16

- Section 08 EXPOSURE CNTL/PERSONAL PROTCTN

EXPOSURE CONTROLS/PERSONAL PROTECTION Procedure
RESPIRATOR :SEE BELOW
VENTILATION :GENERAL VENTILATION IS RECOMMENDED.
OTHER PRACTICES OR EQUIPMENT USEFUL IN MINIMIZING WORKER EXPOSURE
RESPIRATOR

RESPIRATORY PROTECTION IS NOT NORMALLY NEEDED SINCE
THE VOLATILITY AND TOXICITY ARE LOW. IF SIGNIFICANT
VAPORS, MISTS OR AEROSOLS ARE GENERATED, WEAR A NIOSH
APPROVED OR EQUIVALENT RESPIRATOR.
FOR LARGE SPILLS, ENTRY INTO LARGE TANKS, VESSELS OR
ENCLOSED SMALL SPACES WITH INADEQUATE VENTILATION, A
POSITIVE PRESSURE, SELF-CONTAINED BREATHING APPARATUS
IS RECOMMENDED.

PROTECTIVE EQUIPMENT

USE IMPERMEABLE GLOVES AND CHEMICAL SPLASH GOGGLES
WHEN ATTACHING FEEDING EQUIPMENT, DOING MAINTENANCE OR
HANDLING PRODUCT. EXAMPLES OF IMPERMEABLE GLOVES
AVAILABLE ON THE MARKET ARE NEOPRENE, NITRILE, PVC,
NATURAL RUBBER, VITON AND BUTYL (COMPATIBILITY STUDIES
HAVE NOT BEEN PERFORMED).
THE AVAILABILITY OF AN EYE WASH FOUNTAIN AND SAFETY
SHOWER IS RECOMMENDED. IF CLOTHING IS CONTAMINATED,
REMOVE CLOTHING AND THOROUGHLY WASH THE AFFECTED AREA.
LAUNDER CONTAMINATED CLOTHING BEFORE REUSE.

OTHER PROTECTION

HUMAN EXPOSURE CHARACTERIZATION: BASED ON NALCO'S
RECOMMENDED PRODUCT APPLICATION AND OUR RECOMMENDED
PERSONAL PROTECTIVE EQUIPMENT, THE POTENTIAL HUMAN

EXPOSURE IS: LOW.

Section 09 PHYSICAL & CHEMICAL PROPERTIES

PHYSICAL & CHEMICAL PROPERTIES	VALUE	UNIT
APPEARANCE	:LIQUID	
COLOR	:COLORLESS	
DENSITY	:8.5-8.6	LB/GAL
FREEZING POINT F	:ASTM D-1177	DEGF
OTHER TEXT	:SEE BELOW	
PH VALUE	:6 - 10 PH (AT 1%) 6.7	ASTM E-70
PHYSICAL STATE/FORM	:LIQUID	
SOLUBILITY	:COMPLETELY	
SPECIFIC GRAVITY	:SEE BELOW	
VAPOR PRESSURE	:@ 68 DEGREES F	ASTM D-323 MMHG
VISCOSITY	:@ 60 DEGREES F	ASTM D-2983 CPS
VOC	:EPA METHOD 24	LB/GAL
ADDITIONAL CHARACTERISTICS (E.G. APPEARANCE AND ODOR)		
SPECIFIC GRAVITY		

Material Safety Data Sheet

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Printed Date:01/09/01

MSDS Number: CSW9100983 Rev:001 MSDS Status: ASSIGNED CSW MSDS: 99100983

Mfr MSDS No: 036027 Mfr Date : 08/12/97 MSDS Section(s)

Product:ELIMIN-OX OXYGEN SCAVENGER 01 to 16

ADDITIONAL CHARACTERISTICS (E.G. APPEARANCE AND ODOR)

1.02-1.03 @ 60 DEGREES F ASTM D-1298

OTHER TEXT

NOTE: THESE PHYSICAL PROPERTIES ARE TYPICAL VALUES
FOR THIS PRODUCT.

Section 10 STABILITY AND REACTIVITY

STABILITY AND REACTIVITY

DECOMPOSITION :SEE BELOW

INCOMPATIBILITY :SEE BELOW

CONDITIONS TO BE AVOIDED/MATERIALS CHANGING INTRINSIC STABILITY

INCOMPATIBILITY

AVOID MINERAL ACIDS AND NITRITES.

AVOID CONTACT WITH STRONG OXIDIZERS (EG. CHLORINE,
PEROXIDES, CHROMATES, NITRIC ACID, PERCHLORATES,
CONCENTRATED OXYGEN, PERMANGANATES) WHICH CAN GENERATE
HEAT, FIRES, EXPLOSIONS AND THE RELEASE OF TOXIC
FUMES.

DECOMPOSITION

IN THE EVENT OF COMBUSTION CO, CO2, NOX MAY BE FORMED.
DO NOT BREATHE SMOKE OR FUMES. WEAR SUITABLE
PROTECTIVE EQUIPMENT.

- Section 11 TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION AND DATA

Procedure

TOXICITY DATA :SEE BELOW

OTHER EFFECTS FROM OVEREXPOSURE

TOXICITY DATA

ACUTE TOXICITY STUDIES:

ACUTE TOXICITY STUDIES HAVE BEEN CONDUCTED ON THIS
PRODUCT. THE RESULTS ARE SHOWN BELOW.

ACUTE ORAL TOXICITY (ALBINO RATS): LD50 = GREATER
THAN 5 G/KG

ACUTE DERMAL TOXICITY (ALBINO RABBITS): LD50 =
GREATER THAN 2 G/KG

PRIMARY SKIN IRRITATION TEST (ALBINO RABBITS):
SKIN IRRITATION INDEX DRAIZE RATING: 0.23/8.0
MINIMAL IRRITATION

PRIMARY EYE IRRITATION TEST (ALBINO RABBITS):
EYE IRRITATION INDEX DRAIZE RATING: 0.33/110.0
PRACTICALLY NON-IRRITATING

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MSDS Section(s)

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01 to 16

OTHER EFFECTS FROM OVEREXPOSURE

HUMAN HAZARD CHARACTERIZATION:
BASED ON OUR HAZARD CHARACTERIZATION, THE POTENTIAL
HUMAN HAZARD IS: LOW.

- Section 12 ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION AND DATA

Procedure

ENVIRONMENTAL INFO : SEE BELOW

OTHER EFFECTS ON PLANTS, ANIMALS, AND ENVIRONMENT

ENVIRONMENTAL INFO

AQUATIC DATA:

RESULTS BELOW ARE BASED ON THE PRODUCT.

96 HOUR STATIC ACUTE LC50 TO BLUEGILL SUNFISH = 190
PPM

96 HOUR STATIC ACUTE LC50 TO RAINBOW TROUT = 360 PPM

96 HOUR STATIC ACUTE LC50 TO FATHEAD MINNOW = 400 MG/L

96 HOUR NO OBSERVED EFFECT CONCENTRATION IS 100 MG/L
BASED ON NO MORTALITY OR ABNORMAL EFFECTS.

48 HOUR STATIC ACUTE LC50 TO DAPHNIA MAGNA = 96 MG/L

48 HOUR NO OBSERVED EFFECT CONCENTRATION IS 20 MG/L
BASED ON NO MORTALITY OR ABNORMAL EFFECTS.

IF RELEASED INTO THE ENVIRONMENT, SEE CERCLA IN
SECTION 15.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION:
BASED ON OUR HAZARD CHARACTERIZATION, THE POTENTIAL
ENVIRONMENTAL HAZARD IS: LOW.

BASED ON NALCO'S RECOMMENDED PRODUCT APPLICATION AND
THE PRODUCT'S CHARACTERISTICS, THE POTENTIAL
ENVIRONMENTAL EXPOSURE IS: LOW.

- Section 13 DISPOSAL CONSIDERATIONS

DISPOSAL INFORMATION AND DATA Procedure

WASTE DISPOSAL :SEE BELOW

DETERMINING APPROPRIATE DISPOSAL MEASURES

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Mfr MSDS No: 036027 Mfr Date : 08/12/97 MSDS Section(s)

Product:ELIMIN-OX OXYGEN SCAVENGER 01 to 16

DETERMINING APPROPRIATE DISPOSAL MEASURES

WASTE DISPOSAL

IF THIS PRODUCT BECOMES A WASTE, IT DOES NOT MEET THE CRITERIA OF A HAZARDOUS WASTE AS DEFINED UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40 CFR 261, SINCE IT DOES NOT HAVE THE CHARACTERISTICS OF SUBPART C, NOR IS IT LISTED UNDER SUBPART D.

AS A NON-HAZARDOUS LIQUID WASTE, IT SHOULD BE SOLIDIFIED WITH STABILIZING AGENTS (SUCH AS SAND, FLY ASH, OR CEMENT) SO THAT NO FREE LIQUID REMAINS BEFORE DISPOSAL TO AN INDUSTRIAL WASTE LANDFILL. A NON-HAZARDOUS LIQUID WASTE CAN ALSO BE DEEP-WELL INJECTED IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

- Section 14 TRANSPORT INFORMATION

SHIPPING CLASSIFICATION INFORMATION Procedure

OTHER TEXT :SEE BELOW

OTHER TRANSPORT INFORMATION

OTHER TEXT

PROPER SHIPPING NAME/HAZARD CLASS MAY VARY BY PACKAGING, PROPERTIES, AND MODE OF TRANSPORTATION. TYPICAL PROPER SHIPPING NAMES FOR THIS PRODUCT ARE:

ALL TRANSPORTATION MODES: PRODUCT IS NOT REGULATED DURING TRANSPORTATION

Section 15 REGULATORY INFORMATION

REGULATIONS AFFECTING MATERIAL

CERCLA :SEE NOTES

Notes

CERCLA

CERCLA, 40 CFR 117, 302: NOTIFICATION OF SPILLS OF THIS PRODUCT IS NOT REQUIRED.

FEDERAL :SEE NOTES

Notes

FEDERAL

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 (FORMERLY SEC. 307), 40 CFR 116 (FORMERLY SEC. 311): NONE OF THE INGREDIENTS ARE SPECIFICALLY LISTED.

CLEAN AIR ACT, SEC. 111 (40 CFR 60), SEC. 112 (40

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MSDS Number: CSW9100983 Rev:001 MSDS Status: ASSIGNED CSW MSDS: 99100983

Mfr MSDS No: 036027 Mfr Date : 08/12/97 MSDS Section(s)

Product:ELIMIN-OX OXYGEN SCAVENGER 01 to 16

Notes

CFR 61, 1990 AMENDMENTS), SEC. 611 (40 CFR 82, CLASS I AND II OZONE DEPLETING SUBSTANCES):

THIS PRODUCT DOES NOT CONTAIN INGREDIENTS COVERED BY THE CLEAN AIR ACT.

OSHA :SEE NOTES

Notes

OSHA

OSHA'S HAZARD COMMUNICATION RULE, 29 CFR 1910.1200: BASED ON OUR HAZARD EVALUATION, THIS PRODUCT IS NOT HAZARDOUS.

RCRA :SEE NOTES

Notes

RCRA

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), 40 CFR 261 SUBPART C & D: CONSULT SECTION 13 FOR RCRA CLASSIFICATION.

SARA :SEE NOTES

Notes

SARA

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312 AND 313:

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355): THIS PRODUCT DOES NOT CONTAIN INGREDIENTS LISTED IN APPENDIX A AND B AS AN EXTREMELY HAZARDOUS SUBSTANCE.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370): OUR HAZARD EVALUATION HAS FOUND THAT THIS PRODUCT IS NOT HAZARDOUS UNDER 29 CFR 1910.1200.

UNDER SARA 311 AND 312, THE EPA HAS ESTABLISHED THRESHOLD QUANTITIES FOR THE REPORTING OF HAZARDOUS CHEMICALS. THE CURRENT THRESHOLDS ARE: 500 POUNDS OR THE THRESHOLD PLANNING QUANTITY (TPQ), WHICHEVER IS LOWER, FOR EXTREMELY HAZARDOUS SUBSTANCES AND 10,000 POUNDS FOR ALL OTHER HAZARDOUS CHEMICALS.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372): THIS PRODUCT DOES NOT CONTAIN INGREDIENTS ON THE LIST OF TOXIC CHEMICALS.

STATE :SEE NOTES

Notes

STATE

CALIFORNIA PROPOSITION 65:

HYDRAZINE IS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER. THIS PRODUCT CONTAINS LEVELS OF HYDRAZINE AS AN IMPURITY AT LESS THAN 0.01%.

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Mfr MSDS No: 036027 Mfr Date : 08/12/97 MSDS Section(s)

Product:ELIMIN-OX OXYGEN SCAVENGER 01 to 16

Notes

MICHIGAN CRITICAL MATERIALS:

THIS PRODUCT DOES NOT CONTAIN INGREDIENTS LISTED ON
THE MICHIGAN CRITICAL MATERIALS REGISTER.

STATE RIGHT TO KNOW LAWS:

THE FOLLOWING INGREDIENT(S) ARE DISCLOSED FOR
COMPLIANCE WITH STATE RIGHT TO KNOW LAWS:

CARBOHYDRAZIDE 497-18-7

WATER 7732-18-5

TSCA :SEE NOTES

Notes

TSCA

TOXIC SUBSTANCES CONTROL ACT (TSCA):

THE CHEMICAL INGREDIENTS IN THIS PRODUCT ARE ON THE
8(B) INVENTORY LIST (40 CFR 710).

THIS PRODUCT HAS BEEN CERTIFIED AS KOSHER/PAREVE FOR
YEAR-ROUND USE INCLUDING THE PASSOVER SEASON BY THE
CHICAGO RABBINICAL COUNCIL.

WHMIS :SEE NOTES

Notes

WHMIS

THIS IS NOT A WHMIS CONTROLLED PRODUCT UNDER THE HOUSE
OF COMMONS OF CANADA BILL C-70.

Section 16 OTHER INFORMATION

NFPA Ratings	NPCA-HMIS Ratings	Tier II	Tier II Composition
Health Hazard :1	Health :1	Fire :	Pure :
Fire Hazard :0	Flammability:0	Reactivity: Mix	:Y
Reactivity :0	Reactivity :0	Pressure :	Solid :
Special Hazard :	Acute :	Liquid :Y	
	Chronic :	Gas :	

Trade Secret:

ADDITIONAL INFORMATION

VENDOR CONTROL NUMBER = 036027

REFERENCES

THRESHOLD LIMIT VALUES FOR CHEMICAL SUBSTANCES AND
PHYSICAL AGENTS AND BIOLOGICAL EXPOSURE INDICES,
AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL
HYGIENISTS, OH.

HAZARDOUS SUBSTANCES DATA BANK, NATIONAL LIBRARY OF
MEDICINE, BETHESDA MARYLAND (CD-ROM VERSION),
MICROMEDEX, INC., ENGLEWOOD, CO.

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Mfr MSDS No: 036027

Mfr Date : 08/12/97

MSDS Section(s)

Product:ELIMIN-OX OXYGEN SCAVENGER

01 to 16

ADDITIONAL INFORMATION

IARC MONOGRAPHS ON THE EVALUATION OF THE CARCINOGENIC
RISK OF CHEMICALS TO MAN, GENEVA: WORLD HEALTH
ORGANIZATION, INTERNATIONAL AGENCY FOR RESEARCH ON
CANCER.

INTEGRATED RISK INFORMATION SYSTEM, U.S. ENVIRONMENTAL
PROTECTION AGENCY, WASHINGTON, D.C. (CD-ROM VERSION),

MICROMEDEX, INC., ENGLEWOOD, CO.

ANNUAL REPORT ON CARCINOGENS, NATIONAL TOXICOLOGY
PROGRAM. U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES,
PUBLIC HEALTH SERVICE.

TITLE 29 CODE OF FEDERAL REGULATIONS PART 1910,
SUBPART Z, TOXIC AND HAZARDOUS SUBSTANCES,
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA).

REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES,
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH,
CINCINNATI, OHIO (CD-ROM VERSION), MICROMEDEX, INC.,
ENGLEWOOD, CO.

SHEPARD'S CATALOG OF TERATOGENIC AGENTS (CD-ROM
VERSION), MICROMEDEX, INC., ENGLEWOOD, CO.

SUSPECT CHEMICALS SOURCEBOOK (A GUIDE TO INDUSTRIAL
CHEMICALS COVERED UNDER MAJOR REGULATORY AND ADVISORY
PROGRAMS), ROYTECH PUBLICATIONS (A DIVISION OF ARIEL
CORPORATION), BETHESDA, MD.

THE TERATOGEN INFORMATION SYSTEM, UNIVERSITY OF
WASHINGTON, SEATTLE, WASHINGTON (CD-ROM VERSION),
MICROMEDEX, INC., ENGLEWOOD, CO.

PREPARED BY

WILLIAM S. UTLEY, PH.D.,
DABT MANAGER, PRODUCT SAFETY

REVISIONS

08/12/1997

PRINT DATE

12/06/1997

OTHER TEXT

DESCRIPTION: AN AQUEOUS SOLUTION OF A MODIFIED AMINO
COMPOUND

0=INSIGNIFICANT 1=SLIGHT 2=MODERATE 3=HIGH
4=EXTREME

RISK CHARACTERIZATION

DUE TO OUR COMMITMENT TO PRODUCT STEWARDSHIP, WE HAVE
EVALUATED THE HUMAN AND ENVIRONMENTAL HAZARDS AND
EXPOSURES OF THIS PRODUCT. BASED ON OUR RECOMMENDED
USE OF THIS PRODUCT, WE HAVE CHARACTERIZED THE

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Printed Date: 01/09/01

MSDS Number: CSW9100983 Rev:001 MSDS Status: ASSIGNED CSW MSDS: 99100983

Mfr MSDS No: 036027 Mfr Date : 08/12/97 MSDS Section(s)

Product: ELIMIN-OX OXYGEN SCAVENGER 01 to 16

ADDITIONAL INFORMATION

PRODUCT'S GENERAL RISK. THIS INFORMATION SHOULD
PROVIDE ASSISTANCE FOR YOUR OWN RISK MANAGEMENT
PRACTICES. WE HAVE EVALUATED OUR PRODUCT'S RISK AS
FOLLOWS:

* THE HUMAN RISK IS: LOW.

• THE ENVIRONMENTAL RISK IS: LOW.

ANY USE INCONSISTENT WITH NALCO'S RECOMMENDATIONS MAY AFFECT OUR RISK CHARACTERIZATION. OUR SALES REPRESENTATIVE WILL ASSIST YOU TO DETERMINE IF YOUR PRODUCT APPLICATION IS CONSISTENT WITH OUR RECOMMENDATIONS. TOGETHER WE CAN IMPLEMENT AN APPROPRIATE RISK MANAGEMENT PROCESS.

THIS PRODUCT MATERIAL SAFETY DATA SHEET PROVIDES HEALTH AND SAFETY INFORMATION. THE PRODUCT IS TO BE USED IN APPLICATIONS CONSISTENT WITH OUR PRODUCT LITERATURE. INDIVIDUALS HANDLING THIS PRODUCT SHOULD BE INFORMED OF THE RECOMMENDED SAFETY PRECAUTIONS AND SHOULD HAVE ACCESS TO THIS INFORMATION. FOR ANY OTHER USES, EXPOSURES SHOULD BE EVALUATED SO THAT APPROPRIATE HANDLING PRACTICES AND TRAINING PROGRAMS CAN BE ESTABLISHED TO INSURE SAFE WORKPLACE OPERATIONS. PLEASE CONSULT YOUR LOCAL SALES REPRESENTATIVE FOR ANY FURTHER INFORMATION.

BASF Corporation

BASF

Material Safety Data Sheet

Page : 1

Original Date: 03/11/1999
Revision Date: 01/13/2000BASF CORPORATION
3000 CONTINENTAL DRIVE NORTHMOUNT OLIVE, NJ 07828
(973) 426-4671EMERGENCY TELEPHONE: (800) 424-9300 CHEMTREC
(800) 832-HELP (BASF Hotline)

BOTH NUMBERS ARE AVAILABLE DAYS, NIGHTS, WEEKENDS, & HOLIDAYS.

SECTION 1 - PRODUCT INFORMATION

TRILON(R) BAQ CHELATE

Product ID: NCS 559116

Common Chemical Name:

EDTA TETRAAMMONIUM

Synonyms:

TETRAAMMONIUM EDTA

Molecular Formula:

NONE

Chemical Family: Not Applicable

Molecular Wt.: NOT APPLICABLE

SECTION 2 - INGREDIENTS

Chemical Name:	CAS	Amount
WATER	7732-18-5	50.0 %
PEL/TLV NOT ESTABLISHED		
GLYCINE, N,N'-1,2-ETHANED	22473-78-5	48.0 %
PEL/TLV NOT ESTABLISHED		
AMMONIUM HYDROXIDE ((NH ₄))	1336-21-6	2.0 %
ACGIH TLV	STEL 35 PPM	
	TWA 25 PPM	
OSHA PEL	STEL 35 PPM	

SECTION 3 - PHYSICAL PROPERTIES

Color:	Amber
Form/Appearance:	Liquid
Odor:	Ammonia
	Typical
Specific Gravity:	Low/High U.O.M.
	1.16 - 1.19 @ 25 DEG C
pH:	9 - 9.5 SU
	Typical Low/High Deg. @ Pressure
Boiling Pt:	NOT AVAILABLE
Freezing Pt:	NOT AVAILABLE
Decomp. Temp:	NOT AVAILABLE
Solubility in Water Description:	Soluble

3000 Continental Drive - North, Mount Olive, New Jersey 07828-1234 (973) 426-2600

940206

TRILON(R) BAQ CHELATE
NCS 559116

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SECTION 4 - FIRE AND EXPLOSION DATA

	Typical	Low/High	Deg.	Method
Flash Point:	NOT AVAILABLE			
Autoignition:	NOT AVAILABLE			
Extinguishing Media:	Use CO2 or dry chemical extinguishing media.			
Fire Fighting Procedures:	Firefighters should be equipped with self-contained breathing apparatus and turn out gear.			
Unusual Hazards:	There are no known unusual fire or explosion hazards.			

SECTION 5 - HEALTH EFFECTS

Routes of entry for solids and liquids include eye and skin contact, ingestion and inhalation. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquified gases.

Acute Overexposure Effects:

Contact with the eyes may result in temporary irritation. Prolonged or repeated skin contact may result in slight, temporary irritation. Ingestion of large amounts will result in diarrhea and weakness. Inhalation of the vapors or mists may result in respiratory irritation.

Chronic Overexposure Effects:

There are no known chronic effects associated with this material.

First Aid Procedures - Skin:

Wash affected areas with soap and water. Remove and launder contaminated clothing before reuse. If irritation develops, get medical attention.

First Aid Procedures - Eyes:

Immediately rinse eyes with running water for 15 minutes. If irritation develops, get medical attention.

First Aid Procedures - Ingestion:

If swallowed, dilute with water and immediately induce vomiting. Never give fluids or induce vomiting if the victim is unconscious or having convulsions. Get immediate medical attention.

First Aid Procedures - Inhalation:

Move to fresh air. Aid in breathing, if necessary, and get immediate medical attention.

First Aid Procedures - Notes to Physicians:

None known.

First Aid Procedures - Aggravated Medical Conditions:

No data is available which addresses medical conditions that are generally recognized as being aggravated by exposure to this product. Please refer to the effects of overexposure section for effects observed in animals.

First Aid Procedures - Special Precautions:

None

BASF Corporation

BASF

TRILON(R) BAQ CHELATE
NCS 559116

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SECTION 6 - REACTIVITY DATA

Stability Data:

Stable

Incompatibility:

No data available.

Conditions/Hazards to Avoid:

No data available.

Hazardous Decomposition/Polymerization:

Polymerization: Does not occur.

Corrosive Properties:

Not corrosive to metal.

Oxidizer Properties:

Not an oxidizer

Other Reactivity Data:

None known.

SECTION 7 - PERSONAL PROTECTION

Clothing:

Gloves, coveralls, apron, boots as necessary to minimize contact.

Eyes:

Chemical splash goggles.

Respiration:

If vapors or mists are generated, wear a NIOSH/MSHA approved organic vapor/mist respirator or an air-supplied respirator as appropriate.

Ventilation:

Use local exhaust to control vapors/mists.

Explosion Proofing:

None required.

SECTION 8 - SPILL-LEAK/ENVIRONMENTAL

General:

Spills should be contained, solidified and placed in suitable containers for disposal in a licensed facility. This material is not regulated by RCRA or CERCLA ("Superfund"). Wear appropriate respiratory protection and protective clothing and provide adequate ventilation during clean-up.

Waste Disposal:

Incinerate or bury in a licensed facility. Do not discharge into waterways or sewer systems without proper authority.

Container Disposal:

Dispose of in a licensed facility. Recommend crushing or other means to prevent unauthorized reuse.

SECTION 9 - STORAGE AND HANDLING

General:

Store at moderate temperatures, in tight containers.

SECTION 10 - REGULATORY INFORMATION

RCRA Haz. Waste No.: NA

CERCLA: NO Reportable Qty.: (if YES)

BASF Corporation

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TRILON(R) BAQ CHELATE
NCS 559116

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SECTION 10 - REGULATORY INFORMATION (cont)

State Regulatory Information: (By Component)		NJ/PA/MA RIK
CAS:	1336-21-6	YES
NAME:	AMMONIUM HYDROXIDE ((NH ₄))	
CAS:	7732-18-5	NO
NAME:	WATER	
CAS:	22473-78-5	NO
NAME:	GLYCINE, N,N'-1,2-ETHANED	

Hazard Ratings:

	Health:	Fire:	Reactivity:	Special:
HMIS	2	1	0	NA
NFPA	2	1	0	NA

SECTION 11 - TRANSPORTATION INFORMATION

DOT Proper Shipping Name: N/A
DOT Technical Name: N/A
DOT Primary Hazard Class: N/A
DOT Secondary Hazard Class: N/A
DOT Label Required: N/A
DOT Placard Required: N/A
DOT Poison Constituent: N/A
BASF Commodity Codes: UN/NA Codes: E/R Guide: N/A
Bill of Lading Description:

NOT REGULATED BY THE DEPARTMENT OF TRANSPORTATION
"IMPORTANT: WHILE THE DESCRIPTIONS, DESIGNS, DATA AND INFORMATION CONTAINED HEREIN ARE PRESENTED IN GOOD FAITH AND BELIEVED TO BE ACCURATE, IT IS PROVIDED FOR YOUR GUIDANCE ONLY. BECAUSE MANY FACTORS MAY AFFECT PROCESSING OR APPLICATION/USE, WE RECOMMEND THAT YOU MAKE TESTS TO DETERMINE THE SUITABILITY OF A PRODUCT FOR YOUR PARTICULAR PURPOSE PRIOR TO USE. NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE REGARDING PRODUCTS DESCRIBED OR DESIGNS, DATA OR INFORMATION SET FORTH, OR THAT THE PRODUCTS, DESIGNS, DATA OR INFORMATION MAY BE USED WITHOUT INFRINGING THE INTELLECTUAL PROPERTY RIGHTS OF OTHERS. IN NO CASE SHALL THE DESCRIPTIONS, INFORMATION, DATA OR DESIGNS PROVIDED BE CONSIDERED A PART OF OUR TERMS AND CONDITIONS OF SALE. FURTHER, YOU EXPRESSLY UNDERSTAND AND AGREE THAT THE DESCRIPTIONS, DESIGNS, DATA, AND INFORMATION FURNISHED BY BASF HEREUNDER ARE GIVEN GRATIS AND BASF ASSUMES NO OBLIGATION OR LIABILITY FOR THE DESCRIPTION, DESIGNS, DATA AND INFORMATION GIVEN OR RESULTS OBTAINED, ALL SUCH BEING GIVEN AND ACCEPTED AT YOUR RISK".

BASF Corporation

BASF

TRILON(R) BAQ CHELATE
NCS 559116

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SECTION 11 - TRANSPORTATION INFORMATION (cont)

END OF DATA SHEET

3000 Continental Drive - North, Mount Olive, New Jersey 07828-1234 (973) 426-2800

BACSOR

AEPCV-RCRA§3007-0027



Baker Petrolite

Material Safety Data Sheet

Section 1. Chemical Product and Company Identification

Product Name	CRONOX® 240	Code	CRO240
Supplier	Aquaness Chemical A Division Of Baker Petrolite Corporation A Baker Hughes company 12645 W. Airport Blvd. (77478) P.O. Box 5050 Sugar Land, TX 77487-5050 For Product Information/MSDSs Call: 800-231-3606 (8:00 a.m. - 5:00 p.m. cst, Monday - Friday)	Version	1.0
Material Uses	Acid Corrosion Inhibitor.	Effective Date	1/31/2003
24 Hour Emergency Numbers	CHEMTREC 800-424-9300 (U.S. 24 hour) Baker Petrolite 800-231-3606 (North America 24 hour) CANUTEC 613-996-6666 (Canada 24 hours)	Print Date	2/5/2003
<div><div>National Fire Protection Association (U.S.A.)</div><div><div>Health</div><div>2</div><div>2</div><div>0</div><div>Reactivity</div></div><div>Specific Hazard</div><div>Flammability</div></div>			

Section 2. Composition and Information on Ingredients

Name	CAS #	% by Weight	Exposure Limits
1) Heavy aromatic naphtha	64742-94-5	10-30	Not available.
2) Naphthalene	91-20-3	1-5	TWA: 52 STEL: 79 (mg/m ³) from ACGIH (TLV) SKIN TWA: 10 STEL: 15 (ppm) from ACGIH (TLV) SKIN TWA: 10 STEL: 15 (ppm) from OSHA (PEL) TWA: 50 STEL: 75 (mg/m ³) from OSHA (PEL)
3) Oxyalkylated amine	Trade secret	5-10	Not available.
4) Oxyalkylated fatty alcohol	Trade secret	1-5	Not available.
5) Oxyalkylated fatty alcohol	Trade secret	10-30	Not available.
6) Dibutyl thiourea	109-46-6	5-10	Not available.
7) Acetic acid	64-19-7	5-10	TWA: 25 STEL: 37 (mg/m ³) from ACGIH (TLV) TWA: 10 STEL: 15 (ppm) from ACGIH (TLV) TWA: 25 (mg/m ³) from OSHA (PEL) TWA: 10 (ppm) from OSHA (PEL)
8) Alkylpyridine	Trade secret	1-5	Not available.
9) Ethylene Glycol	107-21-1	10-30	CEIL: 100 (mg/m ³) from ACGIH (TLV) CEIL: 50 (ppm) from OSHA CEIL: 125 (mg/m ³) from OSHA

Continued on Next Page

Section 3. Hazards Identification

Physical State and Appearance	State: Clear. Liquid., Color: Dark Brown., Odor: Slight Irritation.
CERCLA Reportable Quantity	Naphthalene 782 gal. Acetic acid 8296 gal. Ethylene Glycol 2323 gal.
Hazard Summary	WARNING. May cause chronic effects. Combustible liquid. At elevated temperatures, vapors can form an ignitable or explosive mixture with air. Can form explosive mixtures at temperatures at or above the flash point. Vapors can flow along surfaces to distant ignition sources and flash back. Static discharges can cause ignition or explosion when container is not bonded. May be irritating to eyes, skin and respiratory tract. Contains a component that may cause cancer. May be toxic by skin absorption.
Routes of Exposure	Skin (Permeator), Skin (Contact), Eyes, Inhalation.
Potential Acute Health Effects	<p><i>Eyes</i> May cause eye irritation.</p> <p><i>Skin</i> May be irritating to skin. May be toxic if absorbed through the skin.</p> <p><i>Inhalation</i> Not considered a likely route of exposure, however, may cause central nervous system (CNS) and/or irritation effects if inhaled. May be irritating to lungs.</p> <p><i>Ingestion</i> Not considered a likely route of exposure, however, may be aspirated into the lungs if swallowed. Can result in chemical pneumonitis (irritation) and pulmonary edema (accumulation of fluids) and hemorrhaging (bleeding).</p>
Medical Conditions aggravated by Exposure	Exposure to this product may aggravate medical conditions involving the following: blood system, kidneys, nervous system, liver, mucous membranes, respiratory tract, skin/epithelium, eyes, central nervous system (CNS), teeth.
See Toxicological Information (section 11)	
Additional Hazard Identification Remarks	May be harmful if ingested. This product may be aspirated into the lungs during swallowing or vomiting of swallowed material. Aspiration into the lungs may produce chemical pneumonitis, pulmonary edema, and hemorrhaging. Repeated or prolonged contact may cause dermatitis (inflammation) and defatting of the skin (dryness).

Section 4. First Aid Measures

Eye Contact	Flush eyes with plenty of water for 15 minutes, occasionally lifting upper and lower eyelids. Get medical attention if irritation occurs.
Skin Contact	Remove and launder or clean contaminated clothing and shoes. Wash with soap and water until no evidence of material remains. Get medical attention if irritation occurs.
Inhalation	Remove to fresh air. Oxygen may be administered if breathing is difficult. If not breathing, administer artificial respiration and seek medical attention. Get medical attention if symptoms appear.
Ingestion	Get medical attention immediately. If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never induce vomiting or give anything by mouth to a victim who is unconscious or having convulsions.
Notes to Physician	Not available.
Additional First Aid Remarks	INGESTION: May be harmful if swallowed.

Continued on Next Page

Section 5. Fire Fighting Measures

Flammability of the Product Combustible liquid. At elevated temperatures, vapors can form an ignitable or explosive mixture with air. Can form explosive mixtures at temperatures at or above the flash point. Vapors can flow along surfaces to distant ignition sources and flash back. Static discharges can cause ignition or explosion when container is not bonded.

OSHA Flammability Class IIIA

Autoignition temperature Not available.

Flash Points CLOSED CUP: 75.6°C (168°F). (TCC)

Flammable Limits L.E.L. Not available. U.E.L. Not available.

Products of Combustion These products are carbon oxides (CO, CO2) nitrogen oxides (NO, NO2...) Sulfur oxides (SO2, SO3...).

Fire Hazards in Presence of Open Flames/Sparks/Static. Heat. Various Substances

Fire Fighting Media and Instructions In case of fire, use foam, dry chemicals, or CO2 fire extinguishers. Evacuate area and fight fire from a safe distance. Water spray may be used to keep fire-exposed containers cool. Keep water run off out of sewers and public water ways. Note that flammable vapors may form an ignitable mixture with air. Vapors may travel considerable distances and flash back if ignited.

Protective Clothing (Fire) Do not enter fire area without proper personal protective equipment, including NIOSH approved self-contained breathing apparatus.

Special Remarks on Fire Hazards Not available.

Section 6. Accidental Release Measures

Spill Put on appropriate personal protective equipment. Keep personnel removed and upwind of spill. Shut off all ignition sources; no flares, smoking, or flames in hazard area. Approach release from upwind. Shut off leak if it can be done safely. Contain spilled material. Keep out of waterways. Dike large spills and use a non-sparking or explosion proof means to transfer material to an appropriate container for disposal. For small spills add absorbent (soil may be used in the absence of other suitable materials) scoop up material and place in a sealed, liquid-proof container. Note that flammable vapors may form an ignitable mixture with air. Vapors may travel considerable distances from spill and flash back, if ignited. Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Other Statements If RQ (Reportable Quantity) is exceeded, report to National Spill Response Office at 1-800-424-8802.

Additional Accidental Release Measures Remarks Not available.

Section 7. Handling and Storage

Handling and Storage Put on appropriate personal protective equipment. Avoid contact with eyes, skin, and clothing. Avoid breathing vapors or spray mists. Use only with adequate ventilation. Store in a dry, cool and well ventilated area. Keep away from heat, sparks and flame. Keep away from incompatibles. Keep container tightly closed and dry. To avoid fire or explosion, ground container equipment and personnel before handling product.

Additional Handling and Storage Remarks Not available.

Continued on Next Page

Section 8: Exposure Controls/Personal Protection

Engineering Controls Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors or particles below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection

Personal Protective Equipment recommendations are based on anticipated known manufacturing and use conditions. These conditions are expected to result in only incidental exposure. A thorough review of the job tasks and conditions by a safety professional is recommended to determine the level of personal protective equipment appropriate for these job tasks and conditions.

Eyes Chemical safety goggles.

Body Wear long sleeves to prevent repeated or prolonged skin contact.

Respiratory Respirator use is not expected to be necessary under normal conditions of use. In poorly ventilated areas, emergency situations or if exposure levels are exceeded, use NIOSH approved full face respirator.

Hands Chemical resistant gloves.

Feet Chemical resistant boots or overshoes.

Other information Nitrile or neoprene gloves. Viton gloves.

**Protective Clothing
(Pictograms)**



**Additional Exposure
Control Remarks** Not available.

Section 9: Typical Physical and Chemical Properties

Physical State and Appearance	Clear. Liquid.	Odor	Slight Irritation.
pH	4 - 5 (10% of product in water.)	Color	Dark Brown.
Specific gravity	1.028 - 1.04 @ 16°C (60°F)		
Density	8.56 - 8.66 lbs/gal @ 16°C (60°F)		
Vapor Density	>1 (Air = 1)		
Vapor Pressure	31 - mm of Hg @ 38°C (100°F)		
Evaporation Rate	Not Available or Not Applicable for Solids.		
VOC	Not available.		
Viscosity	Not available.		
Pour Point	-11.1°C (12°F)		
Solubility (Water)	Dispersible		
Boiling Point	Not available.		
Physical Chemical Comments	Not available.		

Continued on Next Page

Section 10. Stability and Reactivity

Stability and Reactivity	The product is stable.
Conditions of Instability	Not available.
Incompatibility with Various Substances	Oxidizing material.
Hazardous Decomposition Products	Not applicable.
Hazardous Polymerization	Hazardous polymerization is not expected to occur.
Special Stability & Reactivity Remarks	Not available.

Section 11. Toxicological Information**Component Toxicological Information****Acute Animal Toxicity**

1) Heavy aromatic naphtha	ORAL (LD50): Acute: >2000 mg/kg [Rat]. DERMAL (LD50): Acute: >2000 mg/kg [Rabbit].
2) Naphthalene	ORAL (LD50): Acute: 490 mg/kg [Rat]. 2600 mg/kg [Rat]. 2400 mg/kg [Male rat]. DERMAL (LD50): Acute: >20000 mg/kg [Rabbit].
3) Oxyalkylated amine	ORAL (LD50): Acute: 750 mg/kg [Rat].
4) Oxyalkylated fatty alcohol	ORAL (LD50): Acute: 1000 to 8600 mg/kg [Rat]. 1170 to 4940 mg/kg [Mouse].
5) Oxyalkylated fatty alcohol	Not available.
6) Dibutyl thiourea	ORAL (LD50): Acute: 350 mg/kg [Rat].
7) Acetic acid	ORAL (LD50): Acute: 3310 mg/kg [Rat]. DERMAL (LD50): Acute: 1112 mg/kg [Rabbit]. VAPOR (LC50): Acute: 5620 ppm 1 hours [Mouse].
8) Alkylpyridine	ORAL (LD50): Acute: 1400 mg/kg [Rat]. DERMAL (LD50): Acute: >2000 mg/kg [Rabbit].
9) Ethylene Glycol	ORAL (LD50): Acute: 5500 mg/kg [Mouse]. 4700 mg/kg [Rat]. 4000 mg/kg [Female rat]. DERMAL (LD50): Acute: 10600 mg/kg [Rabbit].

Chronic Toxicity Data

1) Heavy aromatic naphtha

Not available.

2) Naphthalene

This product contains naphthalene. A National Toxicology Program (NTP) report concluded there is clear evidence to support carcinogenicity of naphthalene in male and female rats. These observations were based on 2-year inhalation studies in which the test animals were exposed to 10, 30, and 60 ppm naphthalene. In male and female rats, exposure to naphthalene caused significant increases in the incidence of nonneoplastic lesions of the nose (NTP TR-500). The relevance of the rodent findings to humans is questionable.

Naphthalene has caused hemolytic anemia, jaundice, cataracts (Shopp et al, 1984), allergic reactions (Tsykunov & Yakovleva, 1985), possible neurotoxicity (Riala et al, 1984), and aplastic anemia (Harden & Baetjer, 1978) in humans. Increased lung alveolar adenomas were seen in mice exposed to 30 ppm naphthalene for 6hrs/day for 6 months (ACGIH, 1992).

Continued on Next Page

Naphthalene crosses the placenta leading to methemoglobinemia (decreased ability for the blood to carry oxygen), and/or hemolytic anemia, conditions considered especially dangerous to the unborn (Reprotext). Liver and kidney damage has also been seen with exposure to naphthalene (Reprotext).

Peripheral lens opacities occurred in 8 of 21 workers exposed to high levels of naphthalene fumes or vapors for 5 years, but cataracts have not been reported in other occupational studies. (Hathaway et al, 1991).

The International Agency for Research on Cancer (IARC) evaluated naphthalene and concluded that there was sufficient evidence for carcinogenicity in experimental animals, but inadequate evidence that it causes cancer in exposed humans. Accordingly, IARC classified naphthalene as a possible human carcinogen (Group 2B).

3) Oxyalkylated amine

Not available.

4) Oxyalkylated fatty alcohol

Oxyalkylated fatty alcohol is a component of this product. High doses may induce central nervous system depression and eventually convulsions in humans (Gosselin, R.E., H.C. Hodge, R.P. Smith, and N.N. Gleason). Oxyalkylated fatty alcohol has been determined by closed patch testing to cause destruction of the blood vessels of the dermal layer (top layer) of the skin, but had little effect on the epidermal layer in humans. An oral dose of 3900 mg/kg/5 days continuous rats exhibited ataxia, lung, thorax, or respiration dyspnea. An intravenous dose of 84 mg/kg/4weeks intermittent - dogs exhibited gastrointestinal effects resulting in changes in structure or function of salivary glands, nausea, or vomiting; dermatitis of the skin and appendages was also seen. Draize testing performed on the human skin at a dose of 6mg/3days intermittent - moderate reaction; rabbit skin at 500mg/24 hrs - moderate reaction; rabbit eye at 750ug/24 hrs - severe reaction. (RTECS)

5) Oxyalkylated fatty alcohol

Not available.

6) Dibutyl thiourea

Dibutyl thiourea is a component of this product. Oral testing on rats indicates some reproductive effects (RTECS). However, there is no information on the reproductive effects in humans.

7) Acetic acid

Acetic acid is a component of this product. Acetic acid is not expected to produce cumulative toxicity with repeated exposures, because of its central role in metabolism (Clayton & Clayton, 1994). The effects of chronic exposure may involve a thickening and blackening of the skin, especially on the hands (hyperdermatosis) (Ghiringhelli & Difabio, 1957; Parmeggiani & Sassi, 1954; Hathaway et al, 1991). Other effects of chronic exposure include chronic bronchitis, blackened and eroded teeth, pharyngitis and gastritis (Parmeggiani & Sassi, 1954; Hathaway et al, 1991). Chronic exposure at levels up to 200 ppm has produced palpebral edema (swelling of the eyelids), hypertrophy of lymph nodes (enlargement of the lymph nodes), and conjunctival hyperemia (an increased amount of blood in the mucous membrane surrounding the anterior or front of the eyeball) (Clayton & Clayton, 1994).

Acetic acid can cause occupational asthma (Brooks, 1995). One case of a delayed asthmatic response to glacial acetic acid has been reported in a person with bronchial asthma (Kivity et al, 1994).

In a few tests, it has produced reproductive effects in laboratory animals (Reprotext).

8) Alkylpyridine

Alkyl pyridines are a component of this product. Repeated exposure to alkyl pyridines may cause liver and central nervous system effects.

9) Ethylene Glycol

Ethylene glycol (EG) is a component of this product. Chronic ingestion has shown to cause adverse kidney, liver, bladder, and blood effects in laboratory animals (NTP Technical Report, 1993; Fund. Appl. Toxicol. 7:547-65; FD Cosmet Toxicol. Vol. 3:229-34; Drug and Chem Toxicol 13(1):43-70).

EG is an animal teratogen at doses which produced mild toxicity to the mother. EG given at doses up to 5,000 mg/kg/day to pregnant rats or up to 3,000 mg/kg/day to mice induced a wide variety of fetal malformations, including those of the musculoskeletal, bone

Continued on Next Page

marrow, and spleen (RTECS, 1996).

Ethylene glycol is used to cryopreserve embryos of many mammalian species, including pigs, goats, cows and horses (Otoi et al, 1995; Fieni et al, 1995; Hochi et al, 1994). This makes it unlikely that ethylene glycol itself is the active teratogen in whole animal studies. The EG metabolite, glycolic acid, was active in contrast to EG itself for inducing developmental defects in whole rat embryos in culture (Carney et al, 1996). EG inhibited metabolic cooperation of Chinese hamster cells in vitro, a finding which may have implications for its mechanism of teratogenicity (Loch-Caruso et al, 1984).

Product Toxicological Information

Acute Animal Toxicity Not available.

Target Organs blood system, kidneys, nervous system, liver, mucous membranes, respiratory tract, skin/epithelium, eyes, central nervous system (CNS), teeth.

Other Adverse Effects Not available.

Section 12. Ecological Information

Ecotoxicity Not available.

BOD5 and COD Not available.

Biodegradable/OECD Not available.

Toxicity of the Products of Biodegradation Not available.

Special Remarks Not available.

Section 13. Disposal Considerations

Responsibility for proper waste disposal rests with the generator of the waste. Dispose of any waste material in accordance with all applicable federal, state and local regulations. Note that these regulations may also apply to empty containers, liners and rinsate. Processing, use, dilution or contamination of this product may cause its physical and chemical properties to change.

Additional Waste Remarks Not available.

Section 14. Transport Information

DOT Classification Combustible liquid, n.o.s., (contains Aromatic hydrocarbon mixture, Naphthalene), , NA1993, III

DOT Reportable Quantity Naphthalene 782 gal.
Acetic acid 8296 gal.
Ethylene Glycol 2323 gal.

Marine Pollutant Not applicable.

Additional DOT information This material is not regulated by DOT if transported in packagings < 119 gallons.

Emergency Response 128

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Section 15. Regulatory Information

HCS Classification Target Organ Effects. Combustible liquid. At elevated temperatures, vapors can form an ignitable or explosive mixture with air. Can form explosive mixtures at temperatures at or above the flash point. Vapors can flow along surfaces to distant ignition sources and flash back. Static discharges can cause ignition or explosion when container is not bonded. Irritant. Contains a component that may cause cancer..

U.S. Federal Regulations**Environmental Regulations**

Extremely Hazardous Substances: Not applicable to any components in this product.
 SARA 313 Toxic Chemical Notification and Release Reporting: Naphthalene; Ethylene Glycol;
 SARA 302/304 Emergency Planning and Notification substances: Not applicable to any components in this product.
 Hazardous Substances (CERCLA 302): Naphthalene 782 gal.; Acetic acid 8296 gal.; Ethylene Glycol 2323 gal.;
 SARA 311/312 MSDS distribution - chemical inventory - hazard identification: fire; immediate health hazard; delayed health hazard;
 Clean Water Act (CWA) 307 Priority Pollutants: Naphthalene;
 Clean Water Act (CWA) 311 Hazardous Substances: Naphthalene; Acetic acid;
 Clean Air Act (CAA) 112(r) Accidental Release Prevention Substances: Not applicable to any components in this product.

Threshold Planning Quantity (TPQ)

Not applicable.

TSCA Inventory Status

All components are included or are exempted from listing on the US Toxic Substances Control Act Inventory.

This product does not contain any components that are subject to the reporting requirements of TSCA Section 12(b) if exported from the United States.

State Regulations

State specific information is available upon request from Baker Petrolite.

International Regulations**Canada**

All components are compliant with or are exempted from listing on the Canadian Domestic Substance List.

WHMIS (Canada)

B-3, D-2A, D-2B

European Union

All components are included or are exempted from listing on the European Inventory of Existing Commercial Chemical Substances or the European List of Notified Chemical Substances.

International inventory status information is available upon request from Baker Petrolite for the following countries: Australia, and Australia (NICNAS), China, Korea (TCCL), Philippines (RA6969), or Japan.

Harmonized Tariff Code

Not available.

Other Regulatory Information

The components of this product are listed on the TSCA inventory.

Section 16. Other Information**Other Special Considerations**

File 1935

Baker Petrolite Disclaimer

NOTE: The information on this MSDS is based on data which is considered to be accurate. Baker Petrolite, however, makes no guarantees or warranty, either expressed or implied of the accuracy or completeness of this information.

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of this product.

This MSDS was prepared and is to be used for this product. If the product is used as a component in another product, this MSDS information may not be applicable.



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DATE PREPARED: 01/22/2001

MSDS No: V665

ChelClean™ 665 Chelating Agent

REVISION SUMMARY

Revision #: 5

This MSDS replaces the January 15, 2001 MSDS. Any changes in information are as follows:
In Section 15
SARA Title III Notes

NFPA CODES

Fire: 0 Health: 1 Reactivity: 0

HMIS CODES

Fire: 0 Health: 1 Reactivity: 0

MANUFACTURER DISCLAIMER:

[™] Indicates a trade or service mark of HydroChem Industrial Services, Inc.

The information herein is believed to be accurate and is presented in good faith; however, no warranties or representations are made by HydroChem Industrial Services, Inc. regarding the accuracy or completeness of the information.

HydroChem Industrial Services, Inc. shall not be held liable for any damage resulting from the handling, or from contact with the above product.



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DATE PREPARED: 01/22/2001

MSDS No: V665

ChelClean™ 665 Chelating Agent

EMPTY CONTAINER:

Leave label on drum and sell drum to an approved drum reconditioner or triple rinse, crush, and ship to sanitary landfill unless prohibited by local regulations.

RCRA/USEPA WASTE INFORMATION:

This material is not a RCRA regulated material.

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

Proper Shipping Name: V665 Chelating Agent - Not Regulated

Reportable Quantity (RQ) Under CERCLA: None

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

Fire: No Pressure Generating: No Reactivity: No Acute: Yes Chronic: No

313 Reportable Ingredients: Ammonia (4.69%)

Title III Notes: Ammonia includes anhydrous ammonia and aqueous ammonia from water, dissociable ammonia salts and other sources.

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA Status: All components of this material are on the TSCA inventory.

STATE REGULATIONS

PROPOSITION 65 STATEMENT:

This product does not contain any substance(s) which are defined by the state of California to cause cancer, birth defects, or other reproductive effects.

16. OTHER INFORMATION

REASON FOR ISSUE:

Biannual review

Approval date: 01/22/2001



Page: 4

DATE PREPARED: 01/22/2001

MSDS No: V665

ChelClean™ 665 Chelating Agent

HAZARDOUS DECOMPOSITION:

When heated to decomposition, ammonia, oxides of carbon and nitrogen, cyanides and harmful organic fumes are released.

INCOMPATIBLE MATERIALS:

Oxidizing materials.

Contact with aluminum releases hydrogen.

11. TOXICOLOGICAL INFORMATION

ACUTE

Eyes: Irritant. May cause pain, redness, discomfort.

Skin: No effect expected. Prolonged or repeated contact may cause mild irritation.

Ingestion: No effect expected. Swallowing large amounts may cause illness.

Inhalation: No effect expected. Prolonged or repeated exposure may cause mild irritation. Mist is irritating.

TARGET ORGANS:

No data found

GENERAL COMMENTS:

Carcinogens: Not listed by IARC, USA NTP, or USA OSHA.

COMMENTS:

Only selected Registry of Toxic Effects of Chemical Substances (RTECS) data is presented in this document. See the actual entry in RTECS for complete information.

LD50 (rats) > 2,000 mg/kg

12. ECOLOGICAL INFORMATION

GENERAL COMMENTS:

Degradability: Not biodegradable.

Fish Toxicity: No information

COMMENTS:

LC(50) (P. promelas) ranges from 200 to 1000 mg/L for related materials.

13. DISPOSAL CONSIDERATIONS

PRODUCT DISPOSAL

Dispose of in accordance with APL applicable federal, state and local regulations.



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DATE PREPARED: 01/22/2001

MSDS No: V605

ChelClean™ 665 Chelating Agent

STORAGE:

No special precautions required.
Store away from oxidizers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:

Ventilation - General and local ventilation are required.

PERSONAL PROTECTION

EYES AND FACE:

Chemical goggles required and an eye wash in work area.

RESPIRATORY:

None normally needed. For protection from liquid mist, use NIOSH approved respirator with mist protection.

PROTECTIVE CLOTHING:

Clean body covering and chemical resistant gloves.

OTHER USE PRECAUTIONS:

Safety shower and eye wash in the work area.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid

Odor: Ammonia

Color: Light yellow

pH: 5.0

Percent Volatile: 55

Vapor Pressure: Not Determined

Vapor Density: Not Determined

Boiling Point: 219°F 104°C

Freezing Point: 7°F -14°C

Solubility in Water: Completely Miscible in All Proportions

Specific Gravity: 1.21 at 25°C

10. STABILITY AND REACTIVITY

STABLE - Yes

HAZARDOUS POLYMERIZATION - No



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DATE PREPARED: 01/22/2001

MSDS No: V665

ChelClean™ 665 Chelating Agent

SKIN:

Immediately wash with soap and water. Rinse thoroughly. Seek medical attention if effects occur. Launder contaminated shoes and clothing before reuse.

INGESTION:

If swallowed, give 2 glasses of milk (preferred) or water and consult physician.

INHALATION:

Remove to fresh air. See a doctor if effects occur.

5. FIRE FIGHTING MEASURES

Flashpoint and Method: >200°F 93°C Penskey-Martens, CC

Flammable Limits: Not applicable

Autoignition Temperature: Not Determined

EXTINGUISHING MEDIA:

Use alcohol foam, carbon dioxide, dry chemical or water spray when fighting fires involving this material.

HAZARDOUS COMBUSTION PRODUCTS:

When heated to decomposition, ammonia, oxides of carbon and nitrogen, cyanides and harmful organic fumes are released.

FIRE FIGHTING PROCEDURES:

Use water fog to cool hot containers.

FIRE FIGHTING EQUIPMENT:

As in any fire, wear self-contained breathing apparatus pressure-demand, (MSHA/NIOSH approved or equivalent) and full protective clothing to prevent contact with skin and eyes.

6. ACCIDENTAL RELEASE MEASURES

GENERAL PROCEDURES:

Contain with dikes.

Put in plastic drum.

Soak up residual on inert absorbant (dry sand, vermiculite, earth).

Wash spill site after material pickup is complete.

7. HANDLING AND STORAGE

GENERAL PROCEDURES:

Refer to Section 3.

MATERIAL SAFETY DATA SHEET



Page: 1

DATE PREPARED: 01/22/2001

MSDS No: V665

ChelClean™ 665 Chelating Agent

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: ChelClean™ 665 Chelating Agent

Product Code: V665

Product Name: ChelClean™ 665 Chelating Agent

Chemical Family: Chelant

Generic Name: EDTA, diammonium salt

MANUFACTURER:

HydroChem Industrial Services, Inc.

900 Georgia Ave.

Deer Park, TX 77536

Customer Service: (800) 934-9376

24 HR. EMERGENCY TELEPHONE NUMBERS:

Emergency Contact:

HydroChem ER

Emergency Phone

(800) 569-4889

2. COMPOSITION/INFORMATION ON INGREDIENTS

	wt. %	CAS Registry #
Diammonium ethylenediaminetetraacetate	44.5	20824-56-0
Water	~55	7732-18-5

COMMENTS:

Exposure limits for this product are not established.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE:

Light yellow liquid

IMMEDIATE CONCERNS:

Irritating to eyes, respiratory system and skin.

MEDICAL CONDITIONS AGGRAVATED:

None specified by manufacturer

ROUTES OF ENTRY:

Eye and skin contact

4. FIRST AID MEASURES

EYES

Immediately flush eyes with water for 30 minutes while holding eyelids open. Seek medical attention.

MATERIAL SAFETY DATA SHEET

PAGE: 5

Product: VERSENE* DIAMMONIUM EDTA CHELATING AGENT
Product Code: 90602

Effective Date: 02/25/99

Date Printed: 05/14/99

MSD: 000563

mutagenic. Minimal effects reported are likely due to trace metal deficiencies resulting from chelation by EDTA.

12. ECOLOGICAL INFORMATION (For detailed Ecological data, write or call the address or non-emergency number shown in Section 1)

ENVIRONMENTAL FATE

MOVEMENT & PARTITIONING: Based largely or completely on information for similar material. Bioconcentration potential is low (BCF less than 100 or Log Pow less than 3).

DEGRADATION & PERSISTENCE: Biodegradation under aerobic conditions is below detectable limits. Chemical or physical degradation is expected in the environment. Degradation is expected in the soil environment.

ECOTOXICITY: Material is practically non-toxic to fish on an acute basis (LC50 greater than 100 mg/L). Acute LC50 for bluegill (*Lepomis macrochirus*) is 2340 mg/L.

13. DISPOSAL CONSIDERATIONS (See Section 15 for Regulatory Information)

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. THE DOW CHEMICAL COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (Composition/Information On Ingredients).

FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: recycler, reclaimer, incinerator or other thermal destruction device, waste water treatment system, landfill.

As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Center at 800-258-2436 or 517-832-1556 for further details.

14. TRANSPORT INFORMATION

(Continued on page 6, over)

(R) Indicates a Trademark of The Dow Chemical Company

MATERIAL SAFETY DATA SHEET

PAGE: 6

Product: VERSENE* DIAMMONIUM EDTA CHELATING AGENT
Product Code: 90602

Effective Date: 02/25/99 Date Printed: 05/14/99 MSD: 000563

CANADIAN TDG INFORMATION:

For TDG regulatory information, if required, consult transportation regulations, product shipping papers, or your Dow representative.

DEPARTMENT OF TRANSPORTATION (D.O.T.): For DOT regulatory information, if required, consult transportation regulations, product shipping papers or contact your Dow representative.

15. REGULATORY INFORMATION (Not meant to be all-inclusive--selected regulations represented)

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See other sections for health and safety information.

U.S. REGULATIONS

SARA 313 INFORMATION: This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

CHEMICAL NAME	CAS NUMBER	CONCENTRATION
AMMONIA	007664-41-7	4.69 %

Ammonia includes anhydrous ammonia and aqueous ammonia from water dissociable ammonia salts and other sources.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Not to have met any hazard category

(Continued on page 7)

(R) Indicates a Trademark of The Dow Chemical Company

MATERIAL SAFETY DATA SHEET

PAGE: 3

Product: VERSENE* DIAMMONIUM EDTA CHELATING AGENT
Product Code: 90602

Effective Date: 02/25/99

Date Printed: 05/14/99

MSD: 000563

Section".

OTHER FLAMMABILITY INFORMATION: If exposed to fire from another source and water is evaporated, exposure to high temperatures may cause toxic fumes. This material does not burn.

EXTINGUISHING MEDIA: This material does not burn. If exposed to fire from another source, use suitable extinguishing agent for that fire.

FIRE FIGHTING INSTRUCTIONS: Keep people away. Isolate fire area and deny unnecessary entry. This material does not burn. Fight fire for other material that is burning.

PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

6. ACCIDENTAL RELEASE MEASURES (See Section 15 for Regulatory Information)

PROTECT PEOPLE: Isolate area.

PROTECT THE ENVIRONMENT: Prevent wash water entering natural waterways or public water supplies.

CLEANUP: Clean up residual with non-combustible absorbent material and wash with water.

7. HANDLING AND STORAGE

HANDLING: For more Storage and Handling information refer to bulletin 113-1290-394 AMS.

STORAGE: Do not store in aluminum, carbon steel, copper, copper alloys, zinc or nickel containers. Store between 20F and 120F.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Good general ventilation should be sufficient for most conditions.

PERSONAL PROTECTIVE EQUIPMENT:

(Continued on page 4 , over)

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MATERIAL SAFETY DATA SHEET

PAGE: 4

Product: VERSENE* DIAMMONIUM EDTA CHELATING AGENT
Product Code: 90602

Effective Date: 02/25/99 Date Printed: 05/14/99 MSD: 000563

EYE/FACE PROTECTION: Use safety glasses.

SKIN PROTECTION: Use gloves impervious to this material when prolonged or frequently repeated contact could occur.

RESPIRATORY PROTECTION: No respiratory protection should be needed.

EXPOSURE GUIDELINE(S): None established.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Light yellow liquid.
ODOR: Ammonia.
VAPOR PRESSURE: Same as water.
VAPOR DENSITY: Same as water.
BOILING POINT: 219F, 104C.
SOLUBILITY IN WATER: Completely miscible.
SPECIFIC GRAVITY: 1.21 25/25C.
FREEZING POINT: 7F, -14C.

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable under recommended storage conditions.
See Storage Section.

CONDITIONS TO AVOID: None known.

INCOMPATIBILITY WITH OTHER MATERIALS: Avoid contact with oxidizing materials. Avoid contact with metals such as: aluminum. Flammable hydrogen is formed in the presence of aluminum.

HAZARDOUS DECOMPOSITION PRODUCTS: Hazardous decomposition products may include and are not limited to: ammonia.

HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION (See Section 3 for Potential Health Effects. For detailed toxicological data, write or call the address or non-emergency number shown in Section 1).

SKIN: The dermal LD50 has not been determined.

INGESTION: The oral LD50 for rats is >2000 mg/kg.

MUTAGENICITY: Most data indicate that EDTA and its salts are not

(Continued on page 5)

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